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Taxonomic studies of *Alternaria* from Russia: new species on *Asteraceae*

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Abstract — Two new species are added to the 32 *Alternaria* species known on plants of *Asteraceae*. The newly described species are *A. silybi* from *Silybum marianum* and *Alternaria simmonsii* from *Sonchus* sp.

Key words — milk thistle, sow thistle

Introduction

There are 32 accepted *Alternaria* species known on plants of *Asteraceae* (Simmons, 2007). Most of them (24) belong to the group of large-spored species characterized by relatively long conidia with filiform beak. Usually they are pathogenic and have strong host specialization. During the study of mycobiota of weeds and wild herbaceous plants we have obtained a few isolates of two new *Alternaria* species on leaves of milk thistle and sow thistle. The leaves collected had a number of spots and abundant sporulation of *Cercospora* sp. on leaves of milk thistle and *Septoria sonchifolia* Cooke on sow thistle. No *Alternaria* conidia were found on these leaves until specimens were held in damp chambers. Monoconidial isolates were obtained from sporulation produced under damp-chamber conditions.

Materials and methods

For morphological observations cultures were obtained under conditions closely approximate to those recommended by E.G. Simmons (1992, 2007). Monoconidial isolates were cultivated in Petri dishes on potato-carrot agar (PCA) and V-4 (for 1 l medium: 150 ml juice mixture [beet, celery, carrot, tomato 4:3:2:1] and 20 g agar; Mikhailova et al., 2002), which is analogous to V-8, at 24°C under light/dark cycle (12/12 h). Preparations for microscopy

were made after 10–12 days of growth. All strains are kept in the All-Russian Institute of Plant Protection (St. Petersburg) and the All-Russian Collection of Microorganisms – VKM (Moscow). The dried leaves and dried cultures on PCA and V-4 of all strains are available at the herbarium of the Institute – LEP.

Taxonomic description

Alternaria silybi Gannibal, **sp. nov.** Fig. 1

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Ex cultura in agaro V-4 descripta. Conidiophora primaria solitaria, simplicia, ad ca. 50–90(–150) × 5.0–5.5 µm, apice dilatato ad 6.0–7.0 µm. Conidia solitaria; corpus conidiorum in maturitate longe anguste ellipsoideum vel subcylindricum, 50–90 × 15–22 µm, 5–10 transverse septatum, 1-longiseptatum in 1–4(–5) segmentis transversis, laeve, dilute brunneum, 1(–2)-rostratum. Rostrum filamentosum, 70–190 × 2.5–3.5 µm, 1–4(–5) transverse septatum. Habitatio typi in foliis vivis Silybum marianum, Russia, Primorskiy kray, Vladivostok, 1.IX.2006, leg. Ph. B. Gannibal.

Type – Rusia. Primorskiy kray: Vladivostok, Trudovoe, Experimental and Industrial Farm 'Fruit and Berry Experimental Station' (43°18.18'N, 132°06.50'E), from leaf lesion of milk thistle, *Silybum marianum* (L.) Gaertn. (*Asteraceae*), 1.IX.2006, coll. Ph.B. Gannibal. (**Holotype**, LEP 12650 (dried V-4 agar culture); live strain, MF-P050011 (VKM F-4109)).

Etymology: from the Latin *Silybum*, the host genus (milk thistle).

Description – On V-4 cultures are dark olive-grey, later almost black, velvety; aerial mycelium is very weak or absent; diameter of 7-d old colonies is about 60 mm. On PCA colonies are almost colorless with pale brown or olive shade; aerial mycelium is very weak or absent; diameter of 7-d old colonies is 25–35 mm.

On V-4 agar primary conidiophores usually are solitary and uncrowded. They are simple with a single apical conidiogenous locus or sometimes with two loci; (35–)50–90(–150) × 5.0–5.5 µm swollen at the apex up to 6.0–7.0 µm. Conidia are solitary. In old cultures occasionally they can form chains of 2 conidia.

Juvenile conidia are pale and wedge-shaped, long-narrow ellipsoid or subcylindric; usually they initiate production of a narrow-taper beak at a very early stage of development. The body of mature conidia is long-ellipsoid, subcylindric or long-ovoid; usually pale olive brown, sometimes dark; 50–80 × 15–20(–22) µm. Most conidial bodies have (5–)7–10 transverse septa. Longisepta may be absent or present as 1(–2) in 1–3 transverse segments, occasionally in 4–5 segments. The conidial body is slightly constricted near the transverse septa. Sometimes conidia have specific shape of composite cylinder due to blocks of 1–3 transverse segments that have conspicuously different width in comparison with neighbor segments. Conidia have one

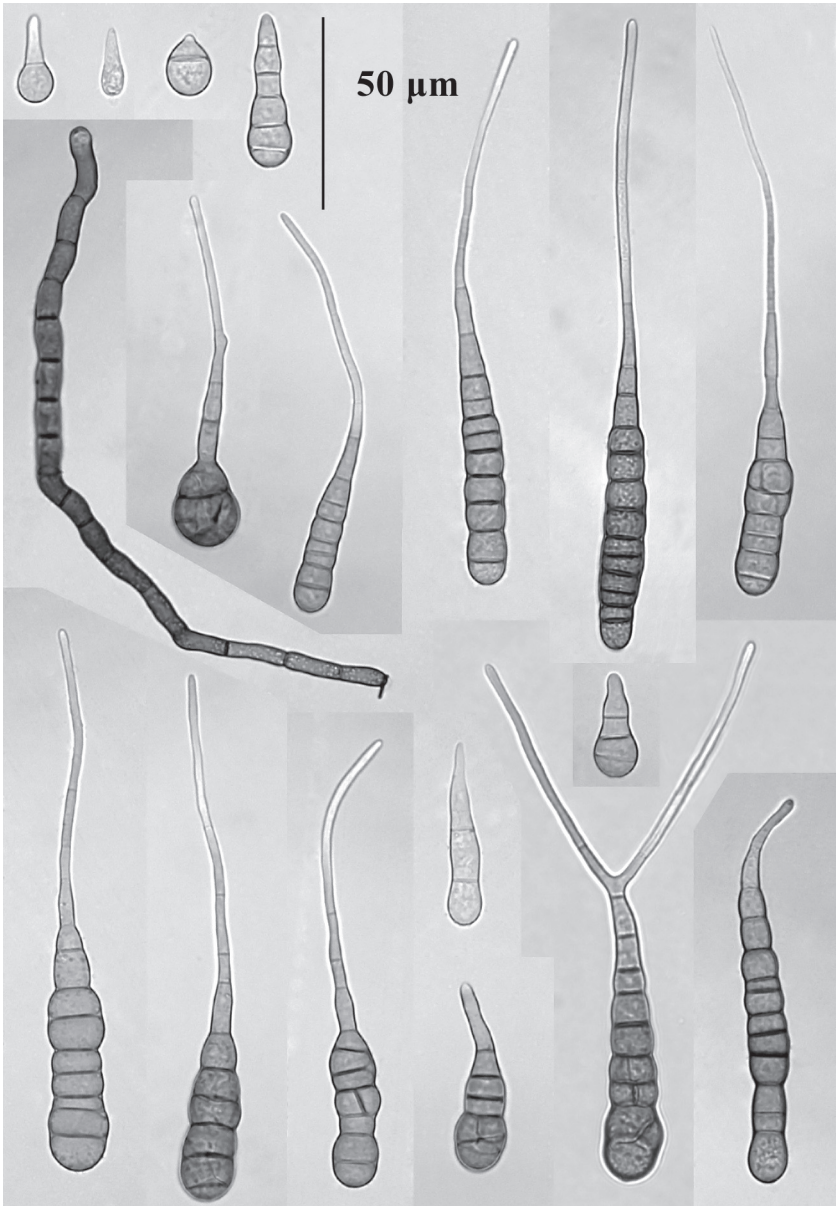

Fig. 1. *Alternaria silybi*: conidia and conidiophores ex holotype

beak, very rarely produce two beaks and/or apical and lateral secondary conidiophores. Filamentous beak length reaches into a range of 70–130 (–190) μm; beaks are ca 3 μm wide throughout most of their length and have 1–4 (–6) transverse septa. In most cases length of the beaks is the same as length of conidial body or rather more; rarely the beak is two times longer.

On PCA conidia are negligibly bigger, 50–90 × 15–22 μm (body) + 100–190 μm (beak).

Strains examined – **RUSSIA**. **Primorskiy kray**: **Vladivostok**, Trudovoe, Experimental and Industrial Farm 'Fruit and Berry Experimental Station' (43°18.18'N, 132°06.50'E)—from leaf lesion of milk thistle, 1.IX.2006 (VKM F-4109 and F-4118). **Primorskiy kray**: **Vladivostok**, Botanical Garden-Institute—from leaf lesion of milk thistle, 6.IX.2006 (VKM F-4117).

Comments – *A. silybi* is similar to *A. protenta* E.G. Simmons, which was also found on *Asteraceae*. *A. silybi* differs by smaller maximal conidium body size, longer beak lengths, and smooth walls.

Alternaria simmonsii Gannibal, **sp. nov.** Fig. 2

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Ex cultura in agaro V-4 descripta. Conidiophora primaria solitaria, simplicia, ad ca. 40–200 × 5–6 μm, brunnea. Conidia solitaria vel in catenis conidiorum bini. Corpus conidiorum late ovoideum vel ellipsoideum, ad 50–90 × 22–30(–36) μm; 5–8 transverse septatum, 1–3 longiseptatum, clare brunneum. Conidia rostrata vel erostrata, rostro longo ad 100 × 3 μm, 1–2(–4) transverse septata. Habitatio typi in foliis vivis Sonchus sp., Russia, Voronezhskaya oblast, Semilukskiy rayon, selo Veduga, 20.V.2005, leg. I. V. Bilder.

Type – Russia. Voronezhskaya oblast: Semilukskiy rayon, selo Veduga, from leaf lesion of sow thistle, *Sonchus* sp. (*Asteraceae*), 20.V.2005, coll. I.V. Bilder. (**Holotype**, LEP 12651 (dried V-4 agar culture); live strain, MF-P024011 (VKM F-4110)).

Etymology: the epithet honours Emory G. Simmons, who has studied *Alternaria* taxonomy for 50 years.

Description – On V-4 cultures are dark olive, later almost black, velvety; aerial mycelium is sparse; diameter of 7-d old colonies is ca 65 mm. On PCA colonies are pale brown or light olive grey; aerial mycelium is very weak or absent; diameter of 7-d old colonies is ca 40 mm.

Primary conidiophores on V-4 agar arise directly from the agar substrate surface or from branches of the woolly aerial mycelium. Usually they are solitary, simple, straight or slightly sinuous, 40–200 × 5–6 μm, with a single apical conidiogenous locus or sometimes with two loci. Conidia are solitary; sometimes they can form chains of 2 conidia.

Juvenile conidia are ovate, rarely ellipsoid or cylindrical, light brown, commonly without beak. The mature conidium body is brown, long ovoid, ellipsoid or bag-shaped, sometimes asymmetric, and becomes fully developed in a size range of ca 50–90 × 22–30(–36) μm. It has 5–8 main transverse

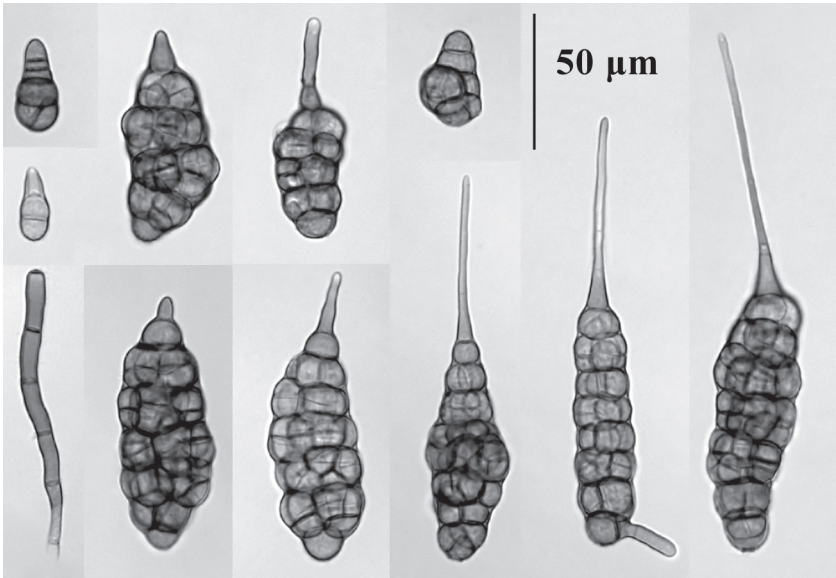

Fig. 2. *Alternaria simmonsii*: conidia and conidiophores ex holotype

constricting divisions. Nearly all well-developed conidia have 1–3 longitudinal and 1 secondary transverse distoseptum divisions in most of the transverse segments. The filamentous, unbranched solitary beak frequently is lacking; when present it is variable in length, and sometimes becomes as long as 100 µm. Beaks are ca 3 µm wide throughout most of their length and have 1–2(–4) transverse septa. Sometimes beaks are slightly swollen at the end. Some basal conidia form 1 apical or/and 1–2 lateral secondary conidiophores.

On PCA the conidial body has a more regular ellipsoid shape than on V-4 and is smaller (40–75 × 17–23 µm); however, the beak is conspicuously longer and sometimes reaches 155 µm long.

Strains examined – **RUSSIA**. **Voronezhskaya oblast**: **Semilukskiy rayon**, selo Veduga—from leaf lesion of sow thistle, 20.V.2005 (VKM F-4110 and F-4119).

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